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Re: U.S. Patent Application Serial No. 10/766,599

Message:

Please see Interview Summary, herewith.

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Attorney Docket No. 028080-0119 (3392A)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Taylor et al.
Serial No: 10/766,599
Filing Date: 01/27/2004
Title: NOISE REDUCTION FOR SPECTROSCOPIC
PROCESSING
Examiner: Daniel R. Sellers
Confirmation No.: 3408
Art Unit: 2644

CERTIFICATE OF FACSIMILE TRANSMITTAL PURSUANT TO 37 C.F.R. § 1.8(a)

I hereby certify that on June 26, 2006, which is the date on which I am signing this certificate, I am transmitting this summary via facsimile to Examiner Sellers at 571-273-7528, the facsimile number of Examiner Sellers, and to the Central Fax No. 571-273-8300 for the prosecution file. A copy of the confirmation is being kept for recordkeeping purposes.

Date: June 26, 2006


Jessica S. Brown

Commissioner for Patents
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**SUMMARY OF TELEPHONE INTERVIEW HELD JUNE 22, 2006
PURSUANT TO 37 C.F.R. 1.133**

This is a summary of the telephonic interview held between Applicant's attorney (Elizabeth Kim) and Examiner Sellers on Thursday June 22, 2006 (and a follow-up call on Monday, June 26, 2006).

A one-page summary of issues that was faxed in advance to the Examiner was discussed (copy enclosed). Pending claims 1-24 were discussed in view of the 35 USC § 103 rejections maintained by the Examiner, in view of an IEEE article "Application of DSP Techniques to Nuclear Magnetic Resonance Spectroscopy" by Worley et al (Worley), and of U.S. Pat. No. 5,041,789 to Keller et al. (Keller). Specifically, the 35 USC § 103 rejections currently maintained by the Examiner are:

the 103(a) rejection of claims 1, 2, and 4-8 over Worley and Keller; the 103(a) rejection of claims 9-13 over Worley, Keller, and US Pat Appln. 2004/0054479 to Trickett; and the 103(a) rejection of claims 3 and 14-24 over Worley, Keller, Broomhead (US Pat. No. 5,453,940), and Okazaki (U.S. Pat. No. 5,148,522)

Regarding these 103(a) rejections, Applicant's attorney brought to the Examiner's attention that a SNR (signal-to-noise ratio) criterion is not equivalent to identifying a gap between a noise-free singular value and a noise singular value, in contrast to the Examiner's statement on the February 24, 2006 Office Action. (In this Office Action, it had been stated: "A SNR criterion is equivalent to identifying a gap between a noise-free singular value and a noise singular value.")

Applicant's attorney provided to the Examiner a standard dictionary definition of an SNR, namely: "power ratio between a signal, or meaningful information, and the background noise," or:

$$\text{"SNR} = P_{\text{signal}} / P_{\text{noise}}"$$

Applicant's attorney further explained to the Examiner that recognizing a link between an SNR criterion and a gap in the plot of singular values of the correlation matrix of the signal, was in fact a core inventive contribution of Applicant's application. Applicant in fact discovered that a sufficient SNR is reached (and thus that no further measurements are needed for averaging purposes) when a gap appears between noise-free singular values and noise singular values in a plot of the singular values of the correlation matrix of the averaged signal.

The Examiner agreed with Applicant's description of the SNR, namely a power ratio between a meaningful signal and the background noise, namely $P_{\text{signal}} / P_{\text{noise}}$

The Examiner maintained, however, that recognizing that a sufficient SNR has been reached when a gap appears between noise-free singular values and noise singular values would have been obvious to one of ordinary skill in the art at the time

of the invention, in view of the combination of Worley, Kelley, and a new prior art reference that previously had not been cited or mentioned in any of the Office Actions. This new prior art reference is: pages 208-225 of "Adaptive Filter Theory," by Simon Haykin, and in particular Table 4.1 on page 215.

The Examiner further suggested that the following amendment to independent claim 1 would overcome the prior art references listed above:

1. An apparatus for performing spectral analysis, the apparatus comprising ... a control system configured to identify a gap between a smallest noise-free singular value and an adjacent first noise singular value, so as to request the data acquisition system to perform additional measurements if no such separation can be identified, and to prevent further measurements from being made by the data acquisition system if the appearance and stability of said gap can be established.

In response, Applicant's attorney suggested that a subsequent telephone interview be held in which the inventor (Professor Taylor) is also present, so that Professor Taylor could provide his feedback regarding the new prior art reference, and the claim amendments proposed by the Examiner.

The Examiner agreed with the above suggestion, and a tentative date and time of the telephone interview (between Examiner Sellers, Applicant's attorney, and inventor Professor Taylor) was scheduled for July 11th at 2 PM.

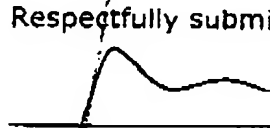
Following the above telephonic interview, Applicant's attorney called the inventor, Professor H. Taylor, to confirm his availability on July 11th at 2 PM. Professor Taylor responded that he would be away for a couple weeks, and that July 17th would be preferable.

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On June 26, 2006, Applicant's attorney called Examiner Sellers once more, and the telephonic interview between Examiner Sellers, Applicant's attorney, and inventor Professor Taylor was confirmed for July 17th at 2 PM.

Respectfully submitted,

Date: June 26, 2006



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**Summary of Issues for Telephonic Interview Re:
US Patent Application No. 10/647,932**

- The Office Action dated Feb 24, 2006 states on page 9: "A SNR criterion is equivalent to identifying a gap between a noise-free singular value and a noise singular value." Applicant respectfully traverses, because a SNR criterion is NOT equivalent to identifying a gap between a noise-free singular value and a noise singular value.

- A SNR (signal-to-noise) criterion is a classic concept, widely known in the field of Applicant's invention, as well as in many other areas of electrical engineering. It is the ratio between the power of the signal, and the power of the noise. The SNR criterion, as known in the art, does NOT involve any singular values of the correlation matrix of the signal, and certainly not any gap between a noise-free singular value and a noise singular value in a plot of such singular values.

- Following is a dictionary definition of SNR:

"Signal-to-noise ratio (often abbreviated SNR) is an engineering term for the power ratio between a signal, or meaningful information, and the background noise:

$$\text{SNR} = P_{\text{signal}} / P_{\text{noise}}"$$

- Recognizing a link between a SNR criterion and a gap in a plot of singular values of the correlation matrix of the signal, is in fact precisely a core inventive contribution of Applicant's application. Namely, Applicant discovered that a sufficient SNR is reached (thus no further measurements are needed for averaging purposes) when a gap appears between noise-free singular values and noise singular values in a plot of the singular values of the correlation matrix of the averaged signal.

- This link between sufficiency of measurements, and a gap in the plot of the singular values of the signal correlation matrix, is not taught or suggested by Keller and Worley, either alone or in combination.

- Therefore, Applicant's claim 1 (and claims dependent thereon) are not rendered obvious by Keller and Worley. ("To establish a *prima facie* case of obviousness, . . . the prior art references must teach or suggest all of the claim limitations." MPEP 2143. That is not the case here.)